In the Claims:

Please amend the claims as indicated below. This listing of claims replaces all prior versions.

1. (currently amended) A method of controlling a digital communication system having a plurality of communication lines on which signals are transmitted and received, the signals being affected by actual interference during transmission, each of the communication lines ~~being used by a user and~~ having at least one transmitter and at least one receiver, the method comprising the steps of:

collecting information about line, signal and the actual interference characteristics of the communication lines;

creating a model of the line, signal and the actual interference characteristics of the communication lines;

~~synchronizing transmissions of signals between transmitters and receivers;~~ and

processing signals using the model to remove interference from signals.

2. (currently amended) The method of Claim 1 wherein the digital communication system is a DSL system and wherein at least one of the steps of collecting, creating, and processing occurs at a common processing node responsive to the signals being affected over the plurality of communication lines.

3. (currently amended) The method of Claim 1 wherein the step of processing signals using the model is ~~performed prior to transmission of a signal~~responsive to the signals being affected over the plurality of communication lines.

4. (currently amended) The method of Claim 1 ~~wherein the step of processing signals using the model is performed after reception of the signals~~further including synchronizing transmission of signals between the plurality of communication lines.

5. (currently amended) The method of Claim [[1]]4 wherein the step of synchronizing

transmissions of signals comprises using block transmission and reception.

6. (currently amended) The method of Claim 1 wherein at least one of the steps of collecting, creating, and processing occurs at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the interference affecting transmission of signals includes crosstalk from communication lines adjacent the communication line on which the signal is sent.

7. (currently amended) The method of Claim 1 wherein at least one of the steps of collecting, creating, and processing occurs at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the digital communication system uses discrete multitone transmission and the step of processing signals using the model to remove interference from signals is done on a tone by tone basis.

8. (currently amended) The method of Claim 1 wherein at least one of the steps of collecting, creating, and processing occurs at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the step of processing signals using the model to remove interference from signals comprises canceling crosstalk interference in signals by QR decomposition.

9. (currently amended) The method of Claim 1 wherein the step of collecting information about line, signal and interference characteristics of the communication lines is performed ~~by a party other than one of the users~~at a common processing node responsive to the signals being affected over the plurality of communication lines.

10. (currently amended) The method of Claim 1 wherein each user is permitted to transmit and receive signals using a data rate and wherein the step of processing signals using the model to remove interference from signals comprises ~~maximizing~~analyzing a weighted sum of the data rates of the ~~users~~signals over the plurality of communication lines.

11. (currently amended) The method of Claim 10 wherein the step of ~~maximizing~~analyzing the weighted sum of the data rates ~~of the users~~ comprises allocating energy to each ~~user~~of the plurality of communication lines for transmission of signals.

12. (currently amended) The method of Claim 1 wherein the signals are sent using a plurality of frequencies and further wherein the step of processing signals using the model to remove interference from signals occurs at a common processing node responsive to the signals being affected over the plurality of communication lines, and comprises dynamically adjusting the frequencies used to send the signals.

13-20. (canceled)

21. (currently amended) A method of controlling a digital communication system having a plurality of communication lines on which signals are transmitted and received, the signals being affected by interference during transmission~~, each of the communication lines being used by a user~~, the method comprising:

creating a model of line, signal and interference characteristics of the communication lines based on signals actually carried by the communication lines; and

processing signals using the model to remove the actual interference from signals.

22. (currently amended) The method of Claim 21 wherein the digital communication system is a DSL system and wherein at least one of the steps of creating and processing occurs at a common processing node responsive to the signals being affected over the plurality of communication lines.

23. (currently amended) The method of Claim 21 wherein the step of processing signals using the model includes modifying a signal ~~prior to transmission of the signal~~ responsive to the signals being affected over the plurality of communication lines.

24. (currently amended) The method of Claim 21 wherein the step of processing signals using the model includes ~~removing interference from a signal after reception of the signal~~synchronizing transmission of signals between the plurality of communication lines.

25. (currently amended) The method of Claim 2[[1]]4 further including the step of synchronizing transmissions of signals using block transmission and reception.

26. (currently amended) The method of Claim 21 wherein at least one of the steps of creating and processing occurs at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the interference affecting transmission of signals includes crosstalk from adjacent ones of the communication lines.

27. (currently amended) The method of Claim 21 wherein at least one of the steps of creating and processing occurs at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the digital communication system uses discrete multitone transmission and the step of processing signals using the model to remove interference from signals is done on a tone by tone basis.

28. (currently amended) The method of Claim 21 wherein at least one of the steps of creating and processing occurs at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the step of processing signals using the model to remove interference from signals comprises canceling crosstalk interference in signals by matrix decomposition.

29. (currently amended) The method of Claim 21 further including the step of collecting information about line, signal and interference characteristics of the communication lines at a ~~location other than a location of one of the users~~common processing node

responsive to the signals being affected over the plurality of communication lines.

30. (currently amended) The method of Claim 21 wherein each user is permitted to transmit and receive signals using a data rate and wherein the step of processing signals using the model to remove interference from signals comprises ~~maximizing~~analyzing a weighted sum of the data rates of the ~~users~~signals over the plurality of communication lines.

31. (currently amended) The method of Claim 30 wherein the step of ~~maximizing~~ analyzing the weighted sum of the data rates ~~of the users~~ comprises allocating energy to each ~~user~~of the plurality of communication lines for transmission of signals.

32. (currently amended) The method of Claim 21 wherein the signals are sent using a plurality of frequencies and further wherein the step of processing signals using the model to remove interference from signals occurs at a common processing node responsive to the signals being affected over the plurality of communication lines, and comprises dynamically adjusting the frequencies used to send the signals.

33-40. (canceled)

41. (currently amended) An arrangement for controlling communication in a digital communication system having a plurality of communication lines on which signals are transmitted and received, the signals being affected by actual interference during transmission~~, each of the communication lines being used by a user~~, the arrangement comprising:

a first processing arrangement adapted to create a model of line, signal and the actual interference characteristics of the communication lines based on signals carried by the communication lines; and

a second processing arrangement adapted to process signals using the model to remove the actual interference from signals.

42. (currently amended) The arrangement of Claim 41 wherein the digital communication system is a DSL system and wherein the second processing arrangement is adapted to process signals at a common processing node responsive to the signals being affected over the plurality of communication lines.

43. (currently amended) The arrangement of Claim 41 wherein the second processing arrangement is further adapted to use the model for modifying a signal ~~prior to transmission of the signal~~ responsive to the signals being affected over the plurality of communication lines.

44. (currently amended) The arrangement of Claim 41 wherein the second processing arrangement is further adapted to use the model for ~~removing interference from a signal after reception of the signal~~synchronizing transmission of signals between the plurality of communication lines.

45. (currently amended) The arrangement of Claim 4[[1]]4 further including at least one block adapted to synchronize transmissions of signals using block transmission and reception.

46. (currently amended) The arrangement of Claim 41 wherein the second processing arrangement is adapted to process signals at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the interference affecting transmission of signals includes crosstalk from adjacent ones of the communication lines.

47. (currently amended) The arrangement of Claim 41 wherein the second processing arrangement is adapted to process signals at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the digital communication system uses discrete multitone transmission and using the model to remove interference from signals is performed on a tone by tone basis.

48. (currently amended) The arrangement of Claim 41 wherein the second processing arrangement is adapted to process signals at a common processing node responsive to the signals being affected over the plurality of communication lines and wherein the second processing arrangement is further adapted to use the model for canceling crosstalk interference in signals by matrix decomposition.

49. (currently amended) The arrangement of Claim 41 further including at least one block adapted to operate independent from other users and adapted to collect information about line, signal and interference characteristics of the communication lines at a common processing node responsive to the signals being affected over the plurality of communication lines.

50. (currently amended) The arrangement of Claim 41 wherein each user is permitted to transmit and receive signals using a data rate and wherein the second processing arrangement is further adapted to ~~maximize~~analyze a weighted sum of the data rates of the ~~users~~signals over the plurality of communication lines.

51. (currently amended) The arrangement of Claim 50 wherein the second processing arrangement is further adapted to allocate energy to each ~~user~~of the plurality of communication lines for transmission of signals.

52. (currently amended) The arrangement of Claim 41 wherein the signals are sent using a plurality of frequencies and further wherein the second processing arrangement is further adapted to dynamically adjust the frequencies used to send the signals.

53-60. (canceled)

61. (currently amended) An arrangement for controlling communication in a digital communication system having a plurality of communication lines on which signals are transmitted and received, the signals being affected by interference during transmission, ~~each of the communication lines being used by a user,~~ the arrangement comprising:

means for creating a model of line, signal and interference characteristics of the communication lines based on signals actually carried by the communication lines; and

means for processing signals using the model to remove the actual interference from signals.

62. (canceled)

63. (new) A method of controlling a digital communication system having a plurality of data-carrying communication lines wherein a line's available total power for use in the system is limited by a power constraint, the method comprising the steps of:

assigning the total power constraint for each line an initial value;

determining a competitively optimal data rate for each line by performing the steps of:

determining a power allocation within the total power constraint of each line by iteratively allowing each line to optimize its power allocation, and

determining the competitively optimal data rate for each line based on the determined power allocation for the line;

creating a model of the line, signal and the actual interference characteristics of the communication lines; and

processing signals using the model to remove interference from signals including evaluating the competitively optimal data rate for each line.

64. (new) The method of Claim 63 wherein evaluating the competitively optimal data rate for each line includes performing the steps of:

comparing the competitively optimal data rate of a line with a target rate for the line;

increasing the power constraint for a line if the competitively optimal data rate of the line is less than the target rate for the line;

decreasing the power constraint for the line if the competitively optimal data rate of the line exceeds the target rate for the line by at least

a prescribed variance;

maintaining the power constraint for the line if the competitively optimal data rate of the line is equal to the target rate for the line; and

maintaining the power constraint for the line if the competitively optimal data rate of the line exceeds the target rate for the line by less than the prescribed variance.

65. (new) The method of Claim 63 wherein the steps of determining a competitively optimal data rate for each line and evaluating the competitively optimal data rate for each line are repeated until no power constraint is increased or decreased.

66. (new) The method of Claim 63 wherein the digital communication system is a DSL system.

67. (new) The method of Claim 63 wherein the total power allowed each line is allocated among a plurality of frequencies.

68. (new) The method of Claim 63 performed by a single entity.

69. (new) The method of Claim 63 performed by the lines in a distributed fashion.

70. (new) The method of Claim 63 wherein crosstalk interference is injected into the communication line by at least one of the other lines and wherein the crosstalk interference is considered by a line in the step of determining the power allocation of the line.

71. (new) The method of Claim 63 wherein each line uses a modem having a power limit and wherein the power constraint of a line will not be increased to a level greater than the modem power limit irrespective of the competitively optimal data rate of the line.

72. (new) A method of controlling a digital communication system having a plurality of data-carrying communication lines wherein a line's available total power for use in the system is limited by a power constraint, the method comprising:

assigning the total power constraint for each line an initial value;

determining a competitively optimal data rate for each by performing the steps of:

determining a power allocation within the total power constraint of each line by iteratively allowing each line to optimize its power allocation, and

determining the competitively optimal data rate for each line based on the determined power allocation for the line;

creating a model of the line, signal and the actual interference characteristics of the communication lines; and

processing signals using the model to remove interference from signals including evaluating the competitively optimal data rate for each line, by performing the steps of:

comparing the competitively optimal data rate of a line with a target rate for the line;

increasing the power constraint for a line if the competitively optimal data rate of the line is less than the target rate for the line;

decreasing the power constraint for the line if the competitively optimal data rate of the line exceeds the target rate for the line by at least a prescribed variance;

maintaining the power constraint for the line if the competitively optimal data rate of the line is equal to the target rate for the line; and

maintaining the power constraint for the line if the competitively optimal data rate of the line exceeds the target rate for the line by less than the prescribed variance.

73. (new) The method of Claim 72 wherein the steps of determining a competitively optimal data rate for each line and evaluating the competitively optimal data rate for

each line are repeated until no power constraint is increased or decreased.

74. (new) The method of Claim 72 wherein the digital communication system is a DSL system.

75. (new) The method of Claim 72 wherein the total power allowed each line is allocated among a plurality of frequencies.

76. (new) The method of Claim 72 performed by a single entity.

77. (new) The method of Claim 72 performed by the lines in a distributed fashion.

78. (new) The method of Claim 72 wherein crosstalk interference is injected into the communication line by at least one of the other lines and wherein the crosstalk interference is considered by a line in the step of determining the power allocation of the line.

79. (new) The method of Claim 72 wherein each line uses a modem having a power limit and wherein the power constraint of a line will not be increased to a level greater than the modem power limit irrespective of the competitively optimal data rate of the line.

80. (new) An arrangement for controlling a digital communication system having a plurality of data-carrying communication lines, wherein a line's available total power for use in the system is limited by a power constraint, the arrangement being adapted and programmed to perform the following steps:

assigning the total power constraint for each line an initial value;

determining a competitively optimal data rate for each by performing the following steps:

determining a power allocation within the total power constraint of each line by iteratively allowing each line to optimize its power

allocation, and

determining the competitively optimal data rate for each line based on the determined power allocation for the line;

creating a model of the line, signal and the actual interference characteristics of the communication lines; and

processing signals using the model to remove interference from signals including evaluating the competitively optimal data rate for each user, by performing the steps of:

comparing the competitively optimal data rate of a line with a target rate for the line;

increasing the power constraint for a line if the competitively optimal data rate of the line is less than the target rate for the line;

decreasing the power constraint for the line if the competitively optimal data rate of the line exceeds the target rate for the line by at least a prescribed variance;

maintaining the power constraint for the line if the competitively optimal data rate of the line is equal to the target rate for the line; and

maintaining the power constraint for the line if the competitively optimal data rate of the line exceeds the target rate for the line by less than the prescribed variance.

81. (new) The arrangement of Claim 80 wherein the steps of determining a competitively optimal data rate for each line and evaluating the competitively optimal data rate for each line are repeated until no power constraint is increased or decreased.

82. (new) The arrangement of Claim 80 wherein the digital communication system is a DSL system.

83. (new) The arrangement of Claim 80 wherein the total power allowed each line is allocated among a plurality of frequencies.

84. (new) The arrangement of Claim 80 performed by a single entity.

85. (new) The arrangement of Claim 80 performed by the lines in a distributed fashion.

86. (new) The arrangement of Claim 80 wherein crosstalk interference is injected into the communication line by at least one of the other lines and wherein the crosstalk interference is considered by a line in the step of determining the power allocation of the line.

87. (new) The arrangement of Claim 80 wherein each line uses a modem having a power limit and wherein the power constraint of a line will not be increased to a level greater than the modem power limit irrespective of the competitively optimal data rate of the line.